

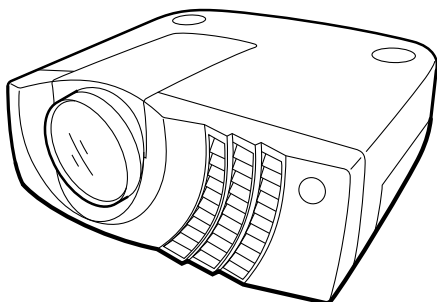
# PROTOCOL MANUAL

For General Release

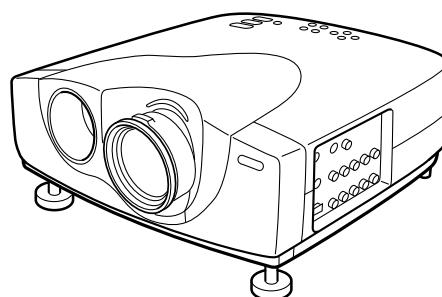
<u>MODEL</u>	<u>DEST.</u>
VPL-PX20	WORLD
VPL-PX30	WORLD
VPL-VW10HT	WORLD

## VERSION 1.0

Projector Firmware ARC32



VPL-PX20/PX30  
LCD DATA PROJECTOR



VPL-VW10HT  
LCD VIDEO PROJECTOR

LCD DATA/VIDEO PROJECTOR

**SONY**<sup>®</sup>

## **WARNING**

This manual is intended for qualified service personnel only.

To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

## **WARNUNG**

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.

Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegebenen Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

## **AVERTISSEMENT**

Ce manuel est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.

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# 1. Introduction

This protocol manual describes the basic configuration and basic operations of various commands used for projector. Projector can be controlled using the commands in the List of Commands provided in Section 9 “COMMANDS”. Using an external CONTROLLER , etc., inputs can be switched and the power can also be turned on and off. In the following paragraphs, “CONTROLLER” means an external device such as a PC which controls projector using these commands.

## 2. Communication Specifications

### <RS-232C Communication Signal>

- Full duplex communication channels (Flow control not performed.)
- Start-stop synchronism system
- Baud rate: 38.4 kbps (bits per second)
- The bit configuration is defined as follows.

1 START Bit + 8 DATA Bits + 1 PARITY Bit + 1 STOP Bit



EVEN Parity.....Total number of "1"s from D0 to D7 is an even number.

### 3. Command Block Format

The code from B0 to B (n) + 2 as described below are transmitted.

①
B0
Start Code

②				
B1	B2	B3	B4	B5
Peripheral Index	Group Index		Device Index	
SENDER (To) Index				

③				
B6	B7	B8	B9	B10
Peripheral Index	Group Index		Device Index	
SENDER (From) Index				

④		
B11	B12	B13
Cmd1	Cmd2	Cmd3
COMMAND		

⑤
B14
Data Length 1 (B16 + 2) (02 – 81 h)
Check Data Length

⑥	⑦
B15	B16
Data Length 2 (00 h)	Data Length 3 (00 – 7 Fh)
Total Data Length B16	
Data Length	

⑧	
Bn	Bm
Data (n)	Data (n + 1, 2, 3, 4...)
Data	

Bn = B16 + 1  
Bm = B16 + Total Data Length

⑨
Bm + 1
Check SUM

⑩
Bm + 2
End Code

## 4. Data of Code

### ① Start Condition

Bn	NAME	DATE (hex)	NOTE
B0	Start Code	A5	Indicates the first packet

### ② INDEX Header

/\*-- RECEIVER INDEX --\*/

B1	PERIPHERAL INDEX	01	01: Projector
B2	GROUP INDEX UPPER BYTE	00	Group Index = 0001 hex
B3	GROUP INDEX LOWER BYTE	01	
B4	DEVICE INDEX UPPER BYTE	00	Device Index = 0001 hex
B5	DEVICE INDEX LOWER BYTE	01	

/\*-- SENDER INDEX --\*/

B6	PERIPHERAL INDEX	03	01: Controller
B7	GROUP INDEX UPPER BYTE	00	Group Index = 0001 hex
B8	GROUP INDEX LOWER BYTE	01	
B9	DEVICE INDEX UPPER BYTE	00	Device Index = 0001 - 0063 hex
B10	DEVICE INDEX LOWER BYTE	01 - 63	

/\*-- Command --\*/

B11	CMD1	Refer to attached	
B12	CMD2	Refer to attached	
B13	CMD3	00	Projector All
		80	LCD Projector All
		90	VPL-PX20, VPL-PX30, VPL-VW10HT only

**Note: CMD1 and CMD2 are assigned with different commands for each unit. Consequently, there is no compatibility of commands between units. For details of the commands, refer to the respective list of commands for the units. Since there is no index function of this unit, the receiver INDEX will be ignored even if the command is designated.**

### ③ Sub Data Size

B14	Data Length 1	02 81	(B16 + 2) hex Data Size
-----	---------------	-------	-------------------------

**Note: Error when 82 to FF hex codes are included.**

### ④ Data Size 2

B15	Data Length 2	00	0: Fixed
-----	---------------	----	----------

**Note: Error when 01 to FF hex codes are included.**



⑤ Data Size 3

B16	Data Length 3	00 7F	Size of ⑥
-----	---------------	-------	-----------

Note: Error when 80 to FF hex codes are included.

⑥ Data

Bn - Bm	Data	XX	No Data in some cases
---------	------	----	-----------------------

Bn = B16 + 1

Bm = B16 + Total Data Length

⑦ Check SUM

Bm + 1	Check Sum	XX	Check sum of Data from ② to ⑥ (Calculate the XOR of the Data from ② to ⑥)
--------	-----------	----	--

XOR is the exclusive OR.

It is as follows when calculated by 1 bit.

Taking A XOR B = C;

A	B	C
0	0	0
1	0	1
0	1	1
1	1	0

<Example of Calculation>

When 0XA5 (165) and 0XA5 (165) are calculated by XOR;

A5	10100101	(165)
A5	10100101	(165)
Answer	00000000	(0)

When 0XA5 (165) and 0X5A (90) are calculated by XOR;

Answer

A5	10100101	(165)
5A	01011010	(90)
Answer	11111111	(255)

⑧ End Condition

Bm + 2	END Code	5A	Indicates the last packet
--------	----------	----	---------------------------

## 5. Connection

### <RS-232C Connection>

Communication is enabled by the use of a D-Sub 9 Pin cross (reverse) cable.

The pin assignment of D-Sub 9 Pin and D-Sub 25 Pin is as follows.

D-Sub 9 Pin	D-Sub 25 Pin	Name	
Shell = FG	1	FG	Grounding for safety protection or cable shield
3	2	TxD	Transmission data
2	3	RxD	Reception data
7	4	RTS	Transmission request
8	5	CTS	Transmission permission
6	6	DSR	Data set ready
5	7	SG	GND for signal
1	8	DCD	Data channel signal carrier detection
4	20	DTR	Data terminal ready
9	22	RI	Calling display (Presence/absence of calling signal)

Pins indicated as D-Sub 25 Pin are not used.

Assured cable length: 15 m (However, assurance may not be applicable for some cables.)

The software for controlling the projector from a PC is intended for performing transmission and reception for only the TxD and RxD lines.

Therefore there is no handshake normally performed by RS-232C.

## 6. Communication Procedure

### 6-1. Outline of Communication

All communication between CONTROLLER (PC, etc.) and DEVICE (PROJECTOR) is performed by the command block format. Communication is started by the issue of a command at CONTROLLER and ended when the return data is sent to CONTROLLER after DEVICE receives the command.

CONTROLLER is prohibited from sending several commands at one time. This means that after CONTROLLER sends one command, it cannot send other commands until DEVICE returns the return data. DEVICE sends the return data after processing the command. The time from when CONTROLLER sends the command until the return data is returned differs according to the contents of the command.

In some cases, CONTROLLER may receive data from DEVICE even though it has not sent a command. (For example, during SYS setting, SIRCS command, and switcher information when switcher is selected.)

**Note: When Sircs Direct Command (CMD1 = 17 hex) is sent, return data may not be returned in some cases.**

### 6-2. Reading the Command Tables

The command tables can be found in Section 9 (page 11).

CMD1 indicates the command category. The ACK from the projector is returned attached with the command category sent from the controller. However, when errors of the communication line occur, 10 hex (COMMON) will be returned.

CMD2 indicates the command processing method and processing results. 00 hex (SET) is set when setting data from the controller to the projector or when requesting for data processing. 01 hex (GET) is set when acquiring data. 2 hex (RETURN) is set when returning the ACK of the command received from the projector to the controller and when attaching data. 03 hex (ACK) is set when returning only the processing results.

However, F0 hex (COMM NAK) is set when the command the projector receives from the controller has a communication line error or checksum inconsistency.

The top of each category indicates the meaning of the data.

## 7. Communication Rules

- When sending a command from CONTROLLER, the return data (CMD1 = 10 hex or CMD1 = each category value, CMD2 = 03 hex) from PROJECTOR should be received first before sending the next command. Even if the next command is sent before receiving the return data, since PROJECTOR will not be able to receive that command, it does not return a response to CONTROLLER. Consequently, no error code is also sent.

The following lists the approximate waiting times for PROJECTOR to return the return data after CONTROLLER sends the command.

- When a communication error occurs, PROJECTOR ignores the data received until now, and set into the reception standby state.
- For undefined commands or commands determined as invalid by PROJECTOR, PROJECTOR will send the “NAK” return data to CONTROLLER .
- Take note that when data is written when the input signal of PROJECTOR is unstable, that data (value) will not be incorporated.
- When INDEX specified SIRCS direct command (CMD1 = 17 hex) is transmitted, leave an interval of 45 mSec until the next transmission. (Do not return the return data (ACK, NAK) when the SIRCS direct command is received.)

## 8. Approximate Return Waiting Times

CMD1	CMD2	DATA1	DATA2	TIME (mSec)
00	00	–	–	20
00	01	–	–	20
01	01	00	01, 02	20
01	00	00	05	20
01	01	00	05	20
03	00	00	–	25
03	00	01	–	20

**Note:** The times shown in this table are when communication is performed in the condition that it will not be interrupted by some reason.





FUNCTION	CMD1	CMD2	DATA1	DATA2	PX20/30	VW10	DATA3	DATA4	DATA5	DATA6	DATA7	DATA8	DATA9	Power Status							
			00 FIXED	32 INPUT-A	<input type="radio"/>	<input type="radio"/>	02 FIXED	00 FIXED	00 COMPUTER 01 COMPONENT 02 DTV-YBPBR 03 DTV-GBR												
			00 FIXED	33 INPUT-B		<input type="radio"/>	02 FIXED	00 FIXED	00 COMPUTER 01 COMPONENT 02 DTV-YBPBR 03 DTV-GBR					<input type="radio"/>	-	-	-	-	-		
			00 FIXED	80 GAIN RED	<input type="radio"/>	<input type="radio"/>	02 FIXED	00 FIXED	00-FF 0-255					<input type="radio"/>	-	-	-	-	-		
			00 FIXED	81 GAIN GREEN	<input type="radio"/>	<input type="radio"/>	02 FIXED	00 FIXED	00-FF 0-255					<input type="radio"/>	-	-	-	-	-		
			00 FIXED	82 GAIN BLUE	<input type="radio"/>	<input type="radio"/>	02 FIXED	00 FIXED	00-FF 0-255					<input type="radio"/>	-	-	-	-	-		
			00 FIXED	83 BIAS RED	<input type="radio"/>	<input type="radio"/>	02 FIXED	00 FIXED	00-FF 0-255					<input type="radio"/>	-	-	-	-	-		
			00 FIXED	84 BIAS GREEN	<input type="radio"/>	<input type="radio"/>	02 FIXED	00 FIXED	00-FF 0-255					<input type="radio"/>	-	-	-	-	-		
			00 FIXED	85 BIAS BLUE	<input type="radio"/>	<input type="radio"/>	02 FIXED	00 FIXED	00-FF 0-255					<input type="radio"/>	-	-	-	-	-		
		REPLY 02h	ADJ USER NO				VALID	LOWER	UPPER	DATA											
			00 FIXED	01 INPUT	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 03	00 FIXED	00 VIDEO 01 S VIDEO 02 INPUT A 03 INPUT B										
			00 FIXED	10 CONTRAST	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 64	00 FIXED	00-64 0-100	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	11 BRIGHTNESS	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 64	00 FIXED	00-64 0-100	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	12 COLOR	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 64	00 FIXED	00-64 0-100	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	13 HUE	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 64	00 FIXED	00-64 0-100	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	14 SHARPNESS	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 64	00 FIXED	00-64 0-100	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	15 RGB ENHANCER	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 64	00 FIXED	00-64 0-100	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	16 VOLUME	<input type="radio"/>		00 FIXED	00 00	00 64	00 FIXED	00-64 0-100	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	17 COL TEMP	<input type="radio"/>		00 FIXED	00 00	00 01	00 FIXED	00 HIGH 01 LOW	<input type="radio"/>	-	-	-	-	-	-	-		
							00 FIXED	00 00	00 05	00 FIXED	00 HIGH 01 LOW 02 CUSTOM1 03 CUSTOM2 04 CUSTOM3 05 CUSTOM4										
			00 FIXED	20 ASPECT	<input type="radio"/>		00 FIXED	00 00	00 01	00 FIXED	00 16:9 01 4:3	<input type="radio"/>	-	-	-	-	-	-	-		
							00 FIXED	00 00	00 06	00 FIXED	00 FULL 01 FULL THROUGH 02 NORMAL 03 NORMAL THROUGH 04 ZOOM 05 SUB TITLE 06 WIDE ZOOM										
			00 FIXED	21 SCAN CONV	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 01	00 FIXED	00 OFF 01 ON	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	30 PICTURE MUTING	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 01	00 FIXED	00 OFF 01 ON	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	31 AUDIO MUTING	<input type="radio"/>		00 FIXED	00 00	00 01	00 FIXED	00 OFF 01 ON	<input type="radio"/>	-	-	-	-	-	-	-		
			00 FIXED	32 INPUT-A	<input type="radio"/>	<input type="radio"/>	00 FIXED	00 00	00 03	00 FIXED	00 COMPUTER 01 COMPONENT 02 DTV-YBPBR 03 DTV-GBR										





FUNCTION	CMD1	CMD2	DATA1	DATA2	PX20/30	VW10	DATA3	DATA4	DATA5	DATA6	DATA7	DATA8	DATA9	Power Status							
MEMORY CATEGORY	03h	SET 00h	<b>RESET</b>	<b>MEMORY NO</b>																	
			00 RESET	01 Channel Memory	<input type="radio"/>	<input type="radio"/>															
				02 Status Memory	<input type="radio"/>	<input type="radio"/>															
				03 Set Memory	<input type="radio"/>	<input type="radio"/>															
			<b>SAVE</b>	<b>MEMORY NO</b>																	
			01 SAVE	04 W/B ALL	<input type="radio"/>	<input type="radio"/>															
				05 W/B LOW	<input type="radio"/>	<input type="radio"/>															
	06 W/B HIGH	<input type="radio"/>	<input type="radio"/>																		
	07 W/B CUSTOM1		<input type="radio"/>																		
	08 W/B CUSTOM2		<input type="radio"/>																		
	09 W/B CUSTOM3		<input type="radio"/>																		
	0A W/B CUSTOM4		<input type="radio"/>																		

**SIRCS CODE**  
**15Bit Category**

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x																
1x			<b>VOLUME + UP</b>	<b>VOLUME - DOWN</b>	<b>AUDIO MUTING</b>	POWER ON/OFF			CONTRAST + HIGH	CONTRAST - LOW	COLOR + HIGH	COLOR - LOW			BRITNESS + BRIGHT	BRITNESS - DARK
2x	HUE + PURPLISH	HUE - GREENISH	SHARPNESS + SHARP	SHARPNESS - SOFT	PICTURE MUTING	STATUS ON	STATUS OFF			MENU	VIDEO	INPUT A	INPUT B		POWER ON	POWER OFF
3x				CURSOR →	CURSOR ←	CURSOR ↑	CURSOR ↓									
4x		ADJ R	ADJ G	ADJ B				RGB SIZE	RGB SHIFT							
5x			W/B GAIN	W/B BIAS				INPUT SELECT	BLANKING		ENTER				MEMORY	S VIDEO
6x																
7x												RESET			<i>PATTERN</i>	

**20Bit Category**

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x																
1x																
2x																
3x																
4x																
5x	<i>VIDEO MEMORY OFF</i>	<i>VIDEO MEMORY 1</i>	<i>VIDEO MEMORY 2</i>	<i>VIDEO MEMORY 3</i>	<i>VIDEO MEMORY 4</i>	<i>VIDEO MEMORY 5</i>	<i>VIDEO MEMORY 6</i>					<i>VIDEO MEMORY TOGGLE</i>				
6x	<b>APA</b>	DOT PHASE						<b>HELP</b>		<b>FUNCTION 1</b>	<b>FUNCTION 2</b>	<b>DIGITAL ZOOM +</b>	<b>DIGITAL ZOOM -</b>			
7x																

**Bold:** PX20/PX30 only  
*Italic:* VW10HT only

**PX20/PX30/VW10HT Communication Basic Structure**

NO	COMMAND NAME	RS232C	CMD1	CMD2	DATA1	DATA2	DATA3	DATA4	DATA5	DATA6	DATA7	DATA8	DATA9	~	Data n	
1	ADJUST CATEGORY	SET	00h	00h	ADJ USER NO	OPTION	DATA									
		GET		01h	ADJ USER NO											
		REPLY		02h	ADJ USER NO	STATUS	LOWER	UPPER	DATA							
		ACK		03h	ACK/NAK	DATA										
2	SYSTEM STATUS CATEGORY	SET	01h	00h	DU USER NO	DATA SIZE	DATA [0]	DATA [1]	~	~	~	~	~	~	DATA [n-1]	
		GET		01h	DU USER NO	DATA SIZE										
		REPLY		02h	DU USER NO	DATA SIZE	DATA [0]	DATA [1]	~	~	~	~	~	DATA [n-1]		
		ACK		03h	ACK/NAK	DATA										
3	SIRCS	SET	17h	00h	CATEGORY	SIRCS CODE	REPEAT	REPEAT NUMBER								
4	MEMORY CATEGORY	REQUEST	03h	00h	SAVE/RESET	MEMORY NO										
		ACK		03h	ACK/NAK	DATA										